

What is claimed is:

1. A designer configurable processor comprising:

- a. a plurality of designer configurable computational units operating in parallel;
- b. a memory device that communicates with the plurality of computational units through a data communication module; and
- c. a software development tool that configures the plurality of computational units and a data path through the data communication module.

2. The processor of claim 1 wherein the designer configurable processor comprises a Very Long Instruction Word (VLIW) processor task engine.

3. The processor of claim 1 wherein the data communication module comprises a register routed data communication module.

4. The processor of claim 1 wherein the memory device stores at least one of data and instruction code.

5. The processor of claim 1 further comprising a task queue that communicates with the data communication module, the task queue scheduling tasks for the processor.

6. The processor of claim 5 wherein the task queue comprises a task queue controller module that communicates with the data communication module and a task queue module that communicates with task queue bus.

7. The processor of claim 6 further comprising an instruction memory that communicates with the task queue controller module, the instruction memory storing tasks for the processor.

8. The processor of claim 1 wherein the software development tool comprise at least one of a compiler, an assembler, an instruction set simulator, or a debugging environment.

9. The processor of claim 1 wherein the software development tool comprises a graphical interface that visually illustrates the configuration of the processor.

1 10. The processor of claim 1 wherein the software development tool generate a synthesizable
2 RTL description of the processor.

1 11. The processor of claim 1 wherein the software development tool configures a data path from
2 the processor to an input/output module.

1 12. The processor of claim 11 wherein the software development tool configures a width of the
2 data path from the processor to the input/output module.

1 13. The processor of claim 1 wherein the software development tool configures a data routing
2 path of at least one of the plurality of computational units.

1 14. The processor of claim 1 wherein the software development tool configures an instruction
2 execution speed of at least one of the plurality of computational units.

1 15. The processor of claim 1 wherein the software development tool configures an energy
2 required to operate at least one of the plurality of computational units.

1 16. The processor of claim 1 wherein the software development tool configures an instruction set
2 of at least one of the plurality of computational units.

1 17. The multi-processor system of claim 1 wherein at least one of the plurality of designer
2 configurable computational units comprises a set of input registers and a set of result registers.

1 18. A designer configurable multi-processor system comprising:

- 2 a. a plurality of designer configurable processors, each of the plurality of processors
3 comprising a plurality of designer configurable computational units operating in parallel;
- 4 b. a memory device that communicates with the plurality of computational units through a
5 data communication module;
- 6 c. an input/output (I/O) module that communicates with at least one of the plurality of
7 processors through an I/O bus; and
- 8 d. a software development tool that configures the multi-processor system.

- 1 19. The multi-processor system of claim 18 wherein at least one of the plurality of plurality of
2 processors comprises a Very Long Instruction Word (VLIW) processor.
- 1 20. The multi-processor system of claim 18 further comprising an instruction memory device
2 that communicates with at least one of the plurality of processors.
- 1 21. The multi-processor system of claim 18 wherein the software development tool generates a
2 synthesizable RTL description of at least one of the plurality of processors.
- 1 22. The multi-processor system of claim 18 wherein the software development tool configures a
2 data path to the I/O module.
- 1 23. The multi-processor system of claim 22 wherein the software development tool configures a
2 width of the data path to the I/O module.
- 1 24. The multi-processor system of claim 18 wherein the software development tool configures a
2 data routing path of at least one of the plurality of computational units.
- 1 25. The multi-processor system of claim 18 wherein the software development tool configures an
2 instruction execution speed of at least one of the plurality of computational units.
- 1 26. The multi-processor system of claim 18 wherein the software development tool configures an
2 energy required to operate at least one of the plurality of computational units.
- 1 27. The processor of claim 18 wherein the software development tool configures an instruction
2 set of at least one of the plurality of computational units.
- 1 28. A method of defining a computational unit for a multi-processor hardware system, the
2 method comprising:
- 3 a. defining an architecture of at least computation unit in a Very Long Instruction Word
4 (VLIW) processor with a software development tool; and
- 5 b. generating data from the software development tool that integrates the at least one
6 computation unit into the VLIW processor task engine.

1 29. The method of claim 28 further comprising defining a data path width of the at least one
2 computation unit with the software development tool.

1 30. The method of claim 28 further comprising defining an internal data routing path of the at
2 least one computation unit with the software development tool.

1 31. The method of claim 28 further comprising defining an energy used to operate the at least
2 one computation unit with the software development tool.

1 32. The method of claim 28 further comprising defining an instruction speed of the at least one
2 computation unit with the software development tool.

1 33. The method of claim 28 further comprising defining an instruction set of the at least one
2 computation unit with the software development tool.

1 34. The method of claim 28 further comprising performing a consistency check to validate the
2 multi-processor hardware system.

1 35. The method of claim 28 wherein the generating data from the software development tool
2 comprises generating scripts for an electronic design automation tool.